WE CLAIM:

1. A breast tomography scanner comprising:

a stationary chamber configured to hold fluid;

a movable chamber within the stationary chamber configured to hold fluid, to move relative to the stationary chamber, and to receive a breast; and

breast scanning apparatus configured to scan the breast received by the movable chamber.

2. The breast tomography scanner of Claim 1 wherein the breast scanning apparatus includes an ultrasonic transmitter and an ultrasonic receiver coupled to the movable chamber and positioned to receive the breast between them.

3. The breast tomography scanner of Claim 2 wherein the movable chamber has an upper rim and wherein the ultrasonic transmitter and the ultrasonic receiver are located at the upper rim.

4. The breast tomography scanner of Claim 3 further including a housing affixed to the upper rim in which the ultrasonic transmitter and ultrasonic receiver are contained.

5. The breast tomography scanner of Claim 4 wherein the housing includes a recessed cavity surrounding the ultrasonic transmitter and ultrasonic receiver.

6. The breast tomography scanner of Claim 1 wherein the movable chamber is configured to rotate about a vertical axis within the stationary chamber.

7. The breast tomography scanner of Claim 6 wherein the movable chamber is configured to move longitudinally along the vertical axis.

8. The breast tomography scanner of Claim 1 wherein the movable chamber has at least one hole other than at its top configured to allow fluid to flow between the movable chamber and the stationary chamber.

9. The breast tomography scanner of Claim 8 wherein the movable chamber has a plurality of holes other than at its top configured to allow fluid to flow between the movable chamber and the stationary chamber.

10. The breast tomography scanner of Claim 9 wherein the movable chamber has a bottom and wherein the plurality of holes are in the bottom.

11. The breast tomography scanner of Claim 10 wherein the movable chamber has a cylindrical wall and wherein the plurality of holes are each adjacent the wall.

12. The breast tomography scanner of Claim 9 wherein the movable chamber has a cylindrical wall and wherein the plurality of holes are in the cylindrical wall.

13. The breast tomography scanner of Claim 12 wherein the movable chamber has a bottom and wherein the plurality of holes are adjacent the bottom.

14. The breast tomography scanner of Claim 1 further including a shaft extending though the stationary chamber and affixed to the movable chamber.

15. The breast tomography scanner of Claim 14 further including a leak-resistant bearing between the shaft and the stationary chamber.

16. The breast tomography scanner of Claim 15 further including a collection chamber positioned beneath the leak-resistant bearing and configured to collect fluid that leaks past the leak-resistant bearing.

17. The breast tomography scanner of Claim 16 further including a suction device connected to the collection chamber to remove fluid collected in the collection chamber.

18. The breast tomography scanner of Claim 16 further including a leak collection tray positioned beneath the collection chamber to collect fluid that leaks past the collection chamber.

19. The breast tomography scanner of Claim 18 further including an alarm in communication with the collection tray and configured to sound in the event that fluid leaks onto the leak collection tray.

20. The breast tomography scanner of Claim 18 further including a power shut off circuit in communication with the collection tray and configured to remove

power from the breast tomography scanner in the event that fluid leaks onto the leak collection tray.

21. The breast tomography scanner of Claim 14 wherein the shaft has an interior and wherein the breast scanning apparatus includes an ultrasonic transducer coupled to the movable chamber and electrical wires attached to the ultrasonic transducer that pass though the interior of the shaft.

22. The breast tomography scanner of Claim 21 wherein the electrical wires are protected from exposure to fluid that is placed in the movable chamber.

23. The breast tomography scanner of Claim 22 wherein the electrical wires are attached to a slip ring assembly mounted to the shaft.

24. The breast tomography scanner of Claim 1 wherein:

the movable chamber is configured to hold a fluid up to a first level;

the stationary chamber is configured to hold fluid up to a second level; and

the second level is higher than the first level.

25. The breast tomography scanner of Claim 24 further including:

a chamber filling pump configured to cause fluid to fill the movable chamber and the stationary chamber; and

a processor configured to control the operation of the chamber filling pump such that the chamber filling pump causes the fluid level in both the movable chamber and the stationary chamber to exceed the first level but not the second level.

26. The breast tomography scanner of Claim 25 wherein the stationary chamber and the movable chamber are configured such that the level of fluid within both of them equalizes.

27. The breast tomography scanner of Claim 1 further including:

a table top having a top surface and a bottom surface positioned above the movable chamber; and

an opening in the table top extending from the top surface to the bottom surface, positioned above the movable chamber, and configured to receive a breast.

28. The breast tomography scanner of Claim 27 further including a drain positioned under the top surface of the table and configured to prevent fluid from flowing from the stationary chamber or movable chamber to the top surface of the table.

29. The breast tomography scanner of Claim 28 wherein the drain is positioned between the top and bottom surface of the table top and is in fluid communication with the opening.

30. The breast tomography scanner of Claim 27 wherein the top surface but not the bottom surface is tapered downwardly in the area of the opening.

31. The breast tomography scanner of Claim 1 further including acoustic coupling fluid in the stationary chamber and the movable chamber that includes a surfactant.

32. The breast tomography scanner of Claim 1 further including:

a drain at the bottom of the stationary chamber to drain fluid from the chamber; and

a slanted surface at the bottom of the stationary chamber configured to direct fluid towards the drain.

33. A breast tomography scanner comprising:

a chamber configured to hold fluid;

a drain at the bottom of the chamber to drain fluid from the chamber; and

a slanted surface at the bottom of the chamber configured to direct fluid towards the drain.

34. A breast tomography scanner comprising:

a chamber configured to hold fluid;

a table top having a top surface and a bottom surface positioned above the chamber; and

an opening in the table top extending from the top surface to the bottom surface, positioned above the chamber, and configured to receive a breast,

wherein the top surface but not the bottom surface is tapered downwardly in the area of the opening.

35. A breast tomography scanner comprising:

a chamber configured to hold fluid and to receive a breast;

an ultrasonic transmitter and an ultrasonic receiver coupled to the chamber and positioned to receive the breast between them;

a housing for housing the ultrasonic transmitter and the ultrasonic receiver, the housing including a recessed cavity surrounding the ultrasonic transmitter and the ultrasonic receiver.